

NOTES.

MESSAGES from Newfoundland announce that Mr. Marconi has succeeded in signalling from England to America by wireless telegraph. Detailed information is not yet available, but it is said that the signals which were received at St. John's, three on Thursday and one on Friday last, though faint were unmistakable, and that Mr. Marconi intends to come immediately to England to increase the power of his transmitters at Poldhu, Cornwall, in order to establish more satisfactory communication across the Atlantic. According to later information the Anglo-American Telegraph Company have given Mr. Marconi notice to remove his instruments from the Colony, as they possess a fifty years' telegraphic monopoly, of which there are still two years to run. This will involve the removal of his experimental station to Nova Scotia or to some other convenient place on the American coast line, and may, perhaps, somewhat delay further experiments. It is to be hoped, however, that we shall before long see a further development of Mr. Marconi's remarkable achievement, upon which if confirmed by subsequent results he cannot be too warmly congratulated. It is interesting to compare the possible rapid development of wireless telegraphy in Mr. Marconi's hands with that of the ordinary telegraph. The first Atlantic cable was not laid until five-and-twenty years after the invention of the telegraph by Gauss and Weber. The earliest proposal to use Hertz waves for signalling was made in 1891, and Mr. Marconi began his experiments four or five years later; at that time he was able to signal two or three miles, and now, after five years' work, he claims to have succeeded in increasing this distance a thousandfold.

GEOLOGISTS and geographers will be glad to learn that they may soon expect the publication of a new map of Iceland on which Mr. Thoroddsen, whose labours in his native island are so well known, has been engaged for twenty years. It is on a scale of 1/600,000, or about twenty English miles to the inch, and thus affords at a glance an excellent picture of the general physical structure and geological characters of the country. But it is also replete with details which are expressed in symbols that take up little space and are readily intelligible. The map, of which we have seen a proof copy, is excellently engraved and printed in colours at Copenhagen, and will be issued under the auspices of the Carlsberg Fund. The title and table of signs and colours are in English.

CONVINCED that increased knowledge of the methods of education on the Continent and in America, with special regard to their bearing on questions of commerce and industry, is required in England, Mr. Alfred Mosely, C.M.G., has offered to defray the whole expense of a commission of inquiry, which would visit parts of the Continent and of America to study the question. At a meeting held on Monday, under the presidency of Lord Reay, Chairman of the London School Board, to confer with Mr. Mosely, it was decided that the inquiry should take place in the autumn of 1902. It is understood that the promoters of the inquiry will endeavour to secure the co-operation of a number of public men representing various types of educational authorities and also the interests of industry and commerce.

THE full text of President Roosevelt's message to the U.S. Senate and House of Representatives has now been received, and we are glad to notice that it contains the following references to the valuable assistance given by the Smithsonian Institution to scientific progress:—"The advancement of the highest interests of national science and learning and the custody of objects of art and of the valuable results of scientific expeditions conducted by the United States have been committed to the Smithsonian Institution. In furtherance of its declared purpose

—for the 'increase and diffusion of knowledge among men'—the Congress has from time to time given it other important functions. Such trusts have been executed by the Institution with notable fidelity. There should be no halt in the work of the Institution, in accordance with the plans which its secretary has presented, for the preservation of the vanishing races of great North American animals in the National Zoological Park. The urgent needs of the National Museum are recommended to the favourable consideration of the Congress."

THE Imperial Leopold Caroline Academy of Science at Halle will celebrate the one hundred and fiftieth anniversary of its foundation on January 1, 1902.

THE first meeting of the Royal Geographical Society in the new year will be held on the afternoon of January 8, when Dr. Vaughan Cornish will give a lecture on "Waves," adapted to young people. At the ordinary meeting on January 13 Dr. Logan Jack will give an account of his recent expedition from Shanghai to Bhamo, and on January 27 Mr. Stanley Gardiner will lecture on the Maldivian Islands.

THE council of the Institution of Mining and Metallurgy announce that a gold medal and premium of the value of fifty guineas, presented by the Consolidated Gold Fields of South Africa, Limited, will be awarded annually to the author of the paper of highest merit contributed to the *Transactions* by any member, associate, or student of the Institution, during the preceding session, upon the mining, treatment, or reduction of gold ores. The first award will be made in June, 1902, and succeeding awards in June in each year.

AN exhibition of burners and appliances connected with the use of gas for illumination and other purposes was opened at the Crystal Palace on Saturday. A development of the Welsbach incandescent light is the inverted burner, on which the cone is fixed in a downward position. It consists of a Bunsen burner fitted with a regulator for the supply of gas and attached to a cone of white china, which acts both as a radiator and as a reflector. Hitherto the difficulty has been to get the Bunsen burner to burn downwards on account of its liability to strike back. This difficulty the manufacturers of the burner claim to have overcome. The construction of the burner, with the globe fixed, closely resembles in appearance the hanging globe of the electric light, and, as there is nothing below the light, no shadow is thrown. A new invention in street lamps is exhibited. This is a high-pressure lamp for burning ordinary gas by the method of a self-intensifying action of combustion, and is said to produce a light of from 300 to 500 candle-power from one burner. There are two stands in the show which exhibit the acetylene light. These are interesting on account of the use which is now being made of that gas, not only for motor-car lights, but also for the illumination of omnibuses in London.

AN exhibition of electrical appliances was opened at the Royal Aquarium on Monday. The exhibits include many ingenious electrical instruments and accessories, such as switchboards, electrical heating and cooking devices, generators, accumulators, Röntgen-ray outfits, lamps, electric clocks, anemometers and electric meters. Mr. W. Langdon, the president of the Institution of Electrical Engineers, who was to have performed the opening ceremony, was unable to be present, owing to his work in connection with the interruption of the telegraphs by the recent gale, but he sent a statement, in the course of which he said that exhibitions were performing good educational work, because they gave the manufacturer an opportunity of bringing his achievements before the public and those interested in their use, and enabled the visitor to obtain a more complete knowledge of the use of what was to be seen. If

England was to compete with other nations in the markets of the world, it was necessary that we should not only foster all our resources, but should also endeavour to see that our merchants and manufacturers were placed in as favourable a position to do so as were those of other nations. President Roosevelt had shown how fully he appreciated the fact that the supremacy of a nation, or, rather, its position in national life, would in future depend upon its commercial success. It would be a great advantage to the producer if he could be placed in possession of information relating to the progress of other lands. This had been recognised by the President of the United States, and they could not help hoping that our own Government would have no hesitation in following his example and promptly establishing a Ministry of Commerce and Manufacture to watch over those all-important branches of our national life.

THE Göttingen Academy of Sciences has decided to establish and maintain at its own expense, during the period of the special international magnetic work, a magnetic observatory near Apia, in the Samoan Islands. The observatory, says *Science*, will be equipped for observations in terrestrial magnetism, atmospheric electricity, meteorology and seismology. This observatory will be nearly magnetically south of the Honolulu observatory, and about the same distance south of the magnetic equator as the latter is north of it. The two observatories will likewise use practically the same instruments and methods, so that interesting and valuable contributions may be expected from them. Mr. A. Nippoldt, of the Potsdam Observatory, will be in charge of the Samoan Observatory.

MR. H. N. RIDLEY, Director of the Botanic Gardens, Singapore, delivered a lecture at the Imperial Institute on Monday entitled "The Economic Resources of the Straits Settlements and the Malay Peninsula." He remarked that the forests, which originally covered the whole peninsula, contain many valuable products, such as timbers, wood-oil, benzoin, gutta-percha and rattans. Owing to the felling of trees by the Malays, gutta-percha, so indispensable for electric work, has been nearly exterminated. Fortunately, however, the product can now be extracted from the leaves and twigs without injury to the trees, which are being planted by the Government. A very large area of the Federated States is under coffee, but on account of the present glut of the market and the consequent low prices, most of the planters are adding Para-rubber to their estates—a tree which thrives marvellously well and produces a very satisfactory amount of rubber of the first quality. India-rubber from the *Ficus elastica* also promises well, but although it is being planted, its product is less highly valued. Accounts were given of the cultivation and preparation of sago—one acre of the sago palm gives as much nourishment as 163 acres of wheat—tapioca, gambir, mangrove-cutch, pepper, nutmegs, cloves, indigo and pineapples. The greater part of the preserved pines of commerce come from Singapore, where the price of the fruit varies from a farthing to a penny each; and the lecturer remembered a time when they had been as cheap as sixteen a penny. The mineral resources of the colony include gold and tin, the latter being found in great abundance.

DURING the past week this country has been visited by disastrous storms, which have caused more interruption to railway and telegraphic communication than has occurred for many years—although in few cases only has the force of a strong gale been reached; the principal damage appears to have been due to the amount and weight of the snowfall. The daily weather reports published by the Meteorological Office show that on the morning of Wednesday, the 11th inst., the barometer was rising generally and that there were no signs of any material change in the weather beyond the fact that shallow cyclonic

areas of a "secondary" character were apparently moving southwards over the northern districts and were likely to occasion snow showers in most parts of the kingdom. But the chart for the next morning showed that a deep cyclonic disturbance had reached our south-west coasts from the Atlantic and was moving in an easterly direction. By Friday morning (13th) communications with many of the northern and north-western stations were completely interrupted. The progress of the storm was rather slow, and the unusual course taken, to the south instead of the north of our islands, brought cold easterly and northerly winds and very heavy snowfall in the north and rainfall in the south. The fall measured at Yarmouth for the twenty-four hours ending 8 a.m. on Friday amounted to two and a half inches (or about the average amount for the month). The loss at sea has not been great, owing, presumably, to timely notice issued to the eastern districts.

SIR CHRISTOPHER FURNESS, M.P., who has recently returned from a business journey through Canada, appears to have been very considerably impressed with the enormous strides that are being made in the development of water-power for manufacturing purposes in that country. On Lake Superior, which is 400 miles long and 160 miles wide, the Lake Superior Power Company, about five or six years ago, commenced operations by constructing a canal from the lake of sufficient capacity to work turbines of 20,000 h.p. This power is used for making pulp for paper from spruce fir, and an area of 8,000,000 acres of forest has been obtained for supplying the wood by grant from the Dominion Government and by purchase. The Algoma Iron and Steel Works have also been established; besides the nickel ore which is being worked, a large find of iron, said to be practically limitless, has been located. Large Bessemer steel works for the manufacture of steel rails, capable of turning out 1000 tons of steel rails a day, are expected to be in operation at the beginning of the new year. In these works electricity has been almost entirely adopted for applying the power to the machinery. Further works for developing 40,000 h.p. are in progress and expected to be completed in about a year and a half.

THE equations of rational dynamics required for the solution of physical problems involve only one independent variable, namely the time. Dr. Leo Königsberger, of Heidelberg, has communicated to the Berlin *Sitzungsberichte* a paper dealing with the extension of the Lagrangian equations to systems involving any number of independent variables, in which the kinetic potential is of the most general possible form. In the present paper Dr. Königsberger treats in detail the case of two independent variables, where the kinetic potential involves only differential coefficients of the first order. The author thus formulates a dynamics of two-dimensional, or *n*-dimensional, time, analogous to the geometry of *n*-dimensional space. Among the most interesting results are those dealing with the conditions under which the principle of conservation of energy holds for two or more independent variables. In the case of two variables it appears that a certain condition must be satisfied in order that an infinite number of integrals of the Lagrangian equations of motion may exist which satisfy the principle of energy, but it is no longer the case that all integrals satisfy the principle in question. A special case is that in which there is only one dependent variable; here the equation of energy is always an integral of the equations of motion.

GEOLOGY and meteorology formed the subject of a brief article in NATURE for November 14. Since then an important essay has been issued on the distribution of vertebrate animals in India, Ceylon, and Burma, by Dr. W. T. Blanford (*Phil. Trans.* 1901), who finds that certain peculiarities in the Indian

fauna may have been due to the Glacial epoch. Ancient terminal moraines occur at an elevation of about 7000 feet in Sikkim, whereas no glacier at the present day is known to descend much below 14,000 feet. The author's observations, moreover, lead him to conclude that the Glacial epoch affected the whole world, and that it was not a partial phenomenon induced by special conditions, such as local elevation.

MR. GEORGE ABBOTT, of Tunbridge Wells, has printed a classified list of the "Cellular" Magnesian Limestone Concretions found in the Permian formation of Sunderland. These concretions are grouped as pseudo-organic or discoid, coralloid, and honeycomb, and are considered by Mr. Abbott to have originated in a different way from the botryoidal masses. He illustrates four stages in each group, remarking that the structures have been produced by the action of a "molecular directive force." As a contribution to the study of "concretionary action" the diagrams should prove useful, but some particulars are desirable with regard to the conditions under which the different groups occur.

IN a letter to the *Centralblatt für Mineralogie* (1901, No. 21, p. 641) Dr. Berwerth, of Vienna, discusses the structure of chondritic meteorites. It will be remembered that according to one view the structure is that of a tuff and the stone is the product of a celestial volcano; according to another view, the structure, though fragmental, is not that of a tuff, but the result of the sudden cooling of a molten mass; according to a third view the chondritic structure is that of a metamorphic rock and may be really of a terrestrial origin, having possibly resulted from the enormous pressure on the stone during its passage through the earth's atmosphere. After a minute petrographical study of the Zavid meteorite, Dr. Berwerth infers that the structure of a chondritic stone is that of a metamorphosed volcanic tuff, and that the metamorphosis has been due, not to great pressure, but to a partial remelting of the material, through exposure of the stone to great heat, followed by quick cooling. The author points out that there may have been a sudden development of heat while the tuff was *in situ*, for instance, through the birth of a new and neighbouring star, or, again, that the stone may have passed through the upper region of a sun's atmosphere during part of its celestial journey.

AMONG a number of papers in the recent issue of the *Proceedings* of the Philadelphia Academy, attention may be directed to one by Mr. H. A. Pilsbry on the Clausilias of the Liu-Kiu (Loo Choo) Islands. A large number of these land-shells are recorded, many of which are new; for one group a new sub-generic term is proposed. A second paper, by A. M. Field, describes in detail the life-history of the ant known as *Stenamma fulvum*. The observations were made, for the most part, on colonies kept in portable nests, of which a description is given in No. 2 of the second volume of the *Biological Bulletin*.

THE first annual general report has been published (1900-1901) of the newly formed Department of Agriculture and Technical Instruction for Ireland, wherein the scope and constitution of that body are defined. The Dublin Science and Art Museum now comes under the cognisance of the Department, and the report of the director is included in the volume before us. It is satisfactory to learn that the Museum is making steady progress in all its sections. Among several interesting additions to the zoological collections during the year, "by far the most important was Ussher's collection of Irish birds' eggs, contained among which are many which have now become rare and practically unobtainable. For the purpose of showing the wide range of variation in clutches such as those of the peregrine falcon, the guillemot and others, Mr. Ussher's

collection is unequalled and invaluable." The director adds that his permanent staff is not sufficiently large to allow him to make all the improvements in the arrangement of the Museum he thinks desirable.

A NEW illustrated catalogue of apparatus for laboratory experiments and lecture demonstrations in frictional and voltaic electricity has been published by Messrs. C. E. Müller, Orme and Co. It is evident from the catalogue that scientific apparatus can now be obtained at a much lower price than formerly.

A WORK on "British Vegetable Galls, an Introduction to their Study, Collection, Mounting, Classification, &c.," by Mr. Edward T. Connold, will be published immediately by Messrs. Hutchinson and Co. The volume will contain numerous illustrations reproduced from photographs of living specimens of vegetable galls.

THE *Electrical Review* devotes practically the whole of its last week's issue (December 13) to electric traction work. The number contains articles by such well-known traction experts as Messrs. Philip Dauson and F. J. Sprague, and also many excellent descriptions and illustrations of machinery and appliances used in traction work, which make it of great value to those engaged or interested in this branch of engineering.

THE first part of a work on "The Fauna and Geography of the Maldivian and Laccadive Archipelagoes," by Mr. J. Stanley Gardiner, was published a few weeks ago by the Cambridge University Press. Mr. Gardiner left England in 1899 as Balfour Student of the University of Cambridge, with a commission to explore and investigate the coral reefs of the Laccadives, Maldives and Ceylon. The results of the expedition will be described in the work now in course of publication. The second part of vol. i. will be published in April next, and when the work has been completed it will be reviewed.

MEMBERS of the British Association are well aware that excellent manuals upon scientific aspects of the places of meeting are prepared under the direction of the Local Committees. In connection with the meeting at Glasgow three volumes of this kind were prepared, and as copies have been sent to us since the conclusion of the meeting we presume they are still available. The subjects are:—"Fauna, Flora and Geology of the Clyde Area," edited by Messrs. G. F. Scott Elliot, Malcolm Laurie and J. Barclay Murdoch; "Local Industries of Glasgow and the West of Scotland," edited by Mr. Angus McClean; and "Handbook of Archaeology, Education, Medical and Charitable Institutions," edited by Prof. Magnus Maclean. The volumes are filled with trustworthy information upon matters of scientific and engineering interest, and deserve to be widely known. Though published particularly for the meeting of the British Association, probably copies can still be obtained from Glasgow booksellers, or the acting secretary of the Local Committee, Mr. John S. Samuel, 30 George Square, Glasgow.

THE additions to the Zoological Society's Gardens during the past week include a Lesser White-nosed Monkey (*Cercopithecus petaurista*) from West Africa, presented by Mrs. K. Harris; a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Captain R. J. Vyner; a Rhesus Monkey (*Macacus rhesus*) from India, presented by Miss Rodel; a Marica Gazelle (*Gazella marica*) from Arabia, presented by Mr. F. C. Strick; a Common Otter (*Lutra vulgaris*) from Scotland, presented by Mr. W. Radcliffe Saunders; a Plantain Squirrel (*Sciurus plantanus*) from Java, presented by Mrs. Beauchant; two South Island Robins (*Miro albifrons*) from New Zealand, deposited; a Nicobar Pigeon (*Calaenas nicobarica*) from the Indian Archipelago, purchased; five Shaw's Gerbilles (*Gerbillus shawi*), born in the Gardens.